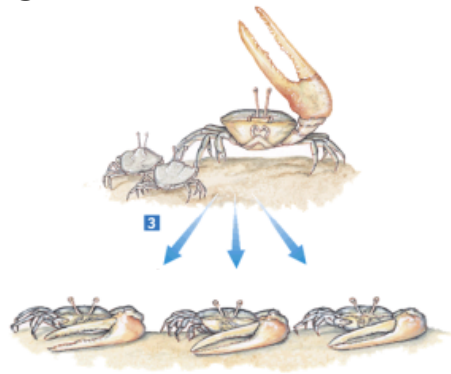




Lamarck's Theory of Acquired Characteristics

58 years before Darwin published his book, Lamarck proposed that you would gain or lose features if you overused or didn't use them, and you could pass these new traits onto your offspring.

Acquired characteristics - traits developed during life and not part of an organism's DNA.



~~Lamarck's Theory of Acquired Characteristics~~

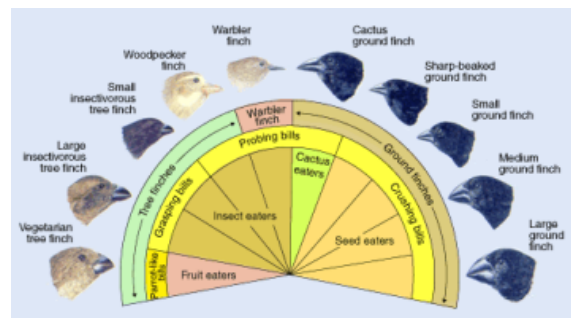
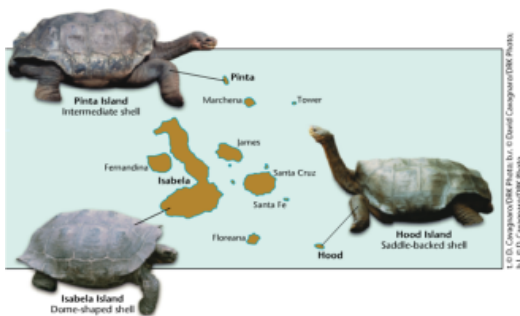
Was not supported by the evidence!

Darwin's Theory of Evolution

Evolution - species change over time



Darwin's Observations



On Galapagos Islands, Darwin saw similar species with traits that suited their particular environment.

Back in England, Darwin noted that plant and animal breeders would breed only the largest hogs, the fastest horses, or the cows that produced the most milk.

Artificial selection - humans select for desired traits, also known as **selective breeding**.



Darwin described the competition of individuals for limited environmental resources as the **struggle for existence**.



1 **The Struggle for Existence** Organisms produce more offspring than can survive. Grasshoppers can lay over 200 eggs at a time. Only a small fraction of these offspring survive to reproduce.

Survival of the fittest -

Individuals that are better suited to their environment survive and reproduce most successfully.

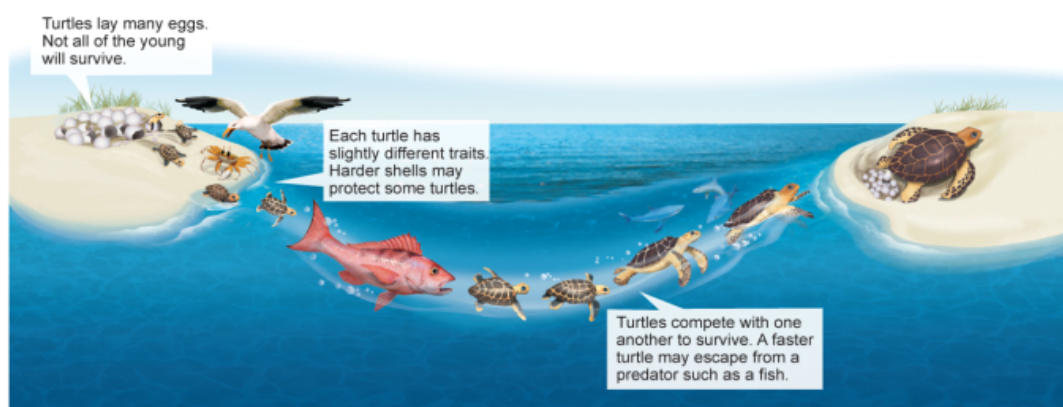
Individuals with characteristics that are not well suited to their environment either die or leave few offspring.



Natural Selection

Darwin described a mechanism to explain how evolution could occur.

This mechanism was called **natural selection**.



Natural selection - process by which organisms with variations most suited to their environment survive and reproduce most successfully.

Darwin's Theory includes the principles of

Descent with Modification - principle that each living species has descended, with changes, from other species, over time

Common descent - principle that all species, living and extinct, have a **common ancestor**.

Adaptation, any inherited characteristic that increases an organism's chance of survival

Types of Adaptations



Carnivores plant to obtain nitrogen

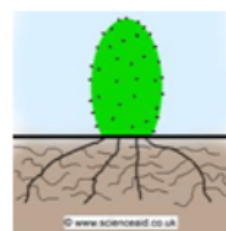


Camouflage to hide from predators or prey



Mimicry to copy other organisms for safety







Long roots to increase surface area and large chance of gaining water in dry conditions



Evidence for Evolution

Geographical distribution of living things

Darwin concluded that in similar environments around the world, **natural selection** would produce similar structures in unrelated species

	Beaver		Coypu
	Muskrat		Capybara
	Beaver and Muskrat		Coypu and Capybara



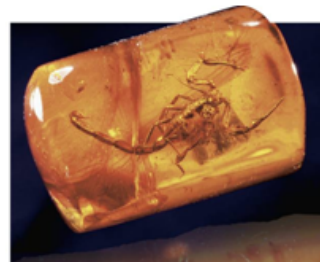
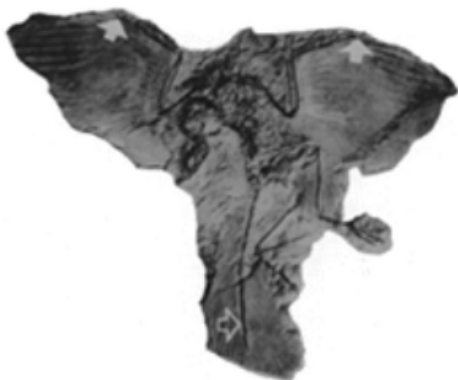
Fossil Record

Darwin collected many fossils on his travels and compared them with living organisms.

Darwin saw the fossil record as a record of evolution.

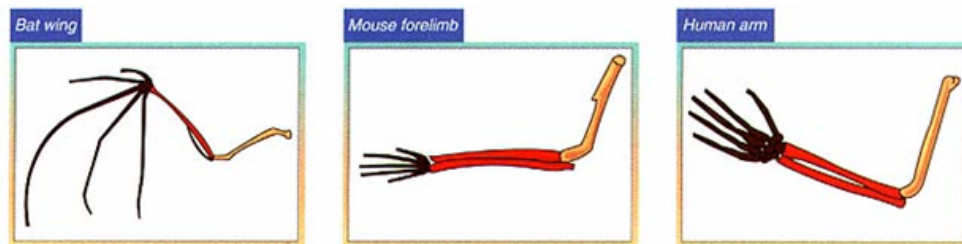
Fossils= Traces of dead organisms such as footprints, insects, bones, leaf impressions, mainly found in sedimentary rocks.

Many things are now extinct (no longer living on earth) and fossils are the proof of their existence.



Homologous Structures

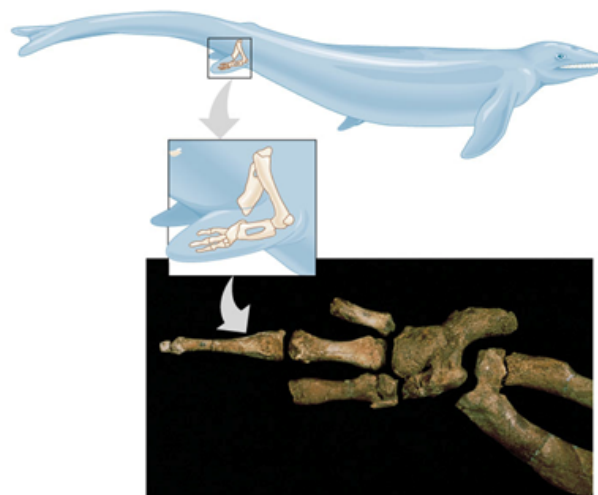
Structures that have different mature forms but develop from the same embryonic tissues are called **homologous structures**. Similarities and differences in homologous structures help biologists group animals according to how recently they last shared a common ancestor.



Vestigial Structures:

structures without function

- They are remnants of evolutionary past.
- Example: Whales have a pelvic bone, but they no longer walk on land.



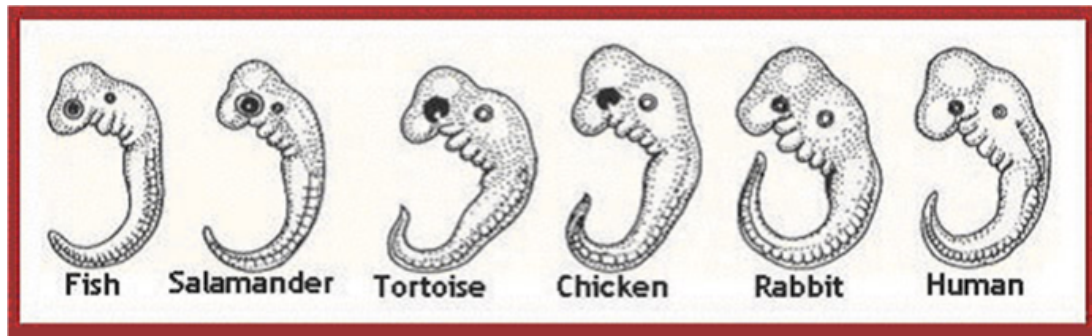
Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

Similarities in Embryology

Embryos are similar when they are developing

It is hard to notice the difference between a bird embryo and a mammal embryo in the early stages.

At one point, human embryos develop a coating of fur!



DNA/Proteins

- Closely related species will have more similarities in their DNA and genes. Knowledge of DNA and Proteins supports evolution.

